

Claims

What is claimed is:

1. A waveguide interferometric electro-optic modulator comprising:
 - a) first and second waveguides formed in an electro-optic substrate; and,
 - b) a plurality of electrodes including: an RF electrode having a width W_{RF} ; and a slotted ground electrode including first and second elongate electrically-connected conductive portions having widths W_F and W_S , respectively defining a slot therebetween;
wherein the first elongate conductive portion is disposed between the RF electrode and the second elongate conductive portion,
wherein W_F is at least 20% greater than W_{RF} ,
wherein the RF electrode is positioned over the electro-optic substrate between the first and the second waveguides or at least partially over one of the first and second waveguides; and
wherein the slotted ground electrode has an overall width substantially greater than the width of the RF electrode and dimensioned to reduce a piezoelectric voltage caused by thermal stress, thereby reducing a net phase shift and a resulting bias point sensitivity of the modulator to ambient temperature.
2. A waveguide interferometric electro-optic modulator as defined in claim 1, wherein the first and second waveguides are coplanar, and wherein the slotted ground electrode is disposed over the other of the first and second waveguides or between the first and second waveguides, the slot for reducing strain accumulated across the width of the slotted ground electrode.
3. A waveguide interferometric electro-optic modulator as defined in claim 2, wherein the width of the first elongate portion of the slotted ground electrode is at least twice the width of the RF electrode along at least a substantial part of their lengths.
4. A waveguide interferometric electro-optic modulator as defined in claim 2, wherein the slotted ground electrode is patterned on the electro-optic substrate.
5. A waveguide interferometric electro-optic modulator as defined in claim 2, wherein the slotted ground

electrode is formed of a first elongate electrode and a second elongate parallel electrode; and wherein a plurality of conductive bridges electrically couple the first and second elongate portions.

6. A co-planar waveguide interferometric electro-optic modulator comprising:

a Z-cut lithium niobate electro-optic substrate;

a first and second waveguide that are formed in the Z-cut lithium niobate electro-optic substrate;

an elongate RF electrode at least partially covering one of the first and second waveguides along its length; and

a slotted electrode formed by two elongate substantially-parallel electrodes, one of which is at least partially covering the other of the first and second waveguides, said at least one electrode being substantially greater in width than the elongate RF electrode, wherein the two elongate substantially parallel electrodes having a gap therebetween defining a slot.

7. A co-planar waveguide interferometric electro-optic modulator as defined in claim 6, wherein the two elongate electrodes are coupled together at predetermined locations by a plurality of conducting bridges or capacitive bridges.

8. A co-planar waveguide interferometric electro-optic modulator as defined in claim 6, wherein the one elongate electrode is at least twice as wide as the RF electrode along a substantial portion of its length.

9. A co-planar waveguide interferometric electro-optic modulator as defined in claim 6, wherein the slot defined between the two elongate substantially parallel electrodes is less than a gap between the one elongate electrode and the RF electrode.

10. A co-planar waveguide interferometric electro-optic modulator as defined in claim 7, wherein the two elongate electrodes each have interdigitated members forming a large capacitor structure for providing capacitive coupling at high frequencies.

11. A co-planar waveguide interferometric electro-optic modulator as defined in claim 2, wherein the slotted ground electrode has interdigitated members forming a large capacitor structure for providing capacitive coupling at high frequencies.

12. A coplanar waveguide interferometric electro-optic modulator as defined in claim 2, further comprising a second ground electrode.

13. A coplanar waveguide interferometric electro-optic modulator as defined in claim 11, further comprising a second slotted ground electrode.

14. A coplanar waveguide interferometric electro-optic modulator as defined in claim 11, wherein one or more of interdigitated members are perpendicular to the RF electrode.